REMARKS

The Office Action mailed May 3, 2004, has been received and reviewed. Applicants note that the Office Action lists claims 1 through 47 as pending. However, Applicants submit that claims 1 through 53 are currently pending in the application, of which claims 1 through 40 are currently under examination. Claims 41 through 53 (listed in the Office Action as claims 41 through 47) are withdrawn from consideration as being drawn to a non-elected invention.

Claims 1 through 3, 5 through 7, 19 through 21, 23, 29, 31, 32 and 40 stand rejected. Claims 4, 8 through 18, 22, 24 through 28, 30, and 32 through 39 have been objected to as being dependent upon rejected base claims, but the indication of allowable subject matter in such claims is noted with appreciation.

Per this response, Applicants have cancelled claims 41 through 53, amended claims 1, 2, 20 and 29 nonsubstantively and without in any way surrendering any original scope as filed, and respectfully request reconsideration of the application in view of the arguments set forth hereinbelow.

35 U.S.C. § 102(b) Anticipation Rejections

Anticipation Rejection Based on U.S. Patent No. 3,596,269 to Laska

Claims 1 through 3, 5 through 7, 19 through 21, 23, 29, 31 and 32 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Laska (U.S. Patent No. 3,596,269). Applicants respectfully traverse this rejection, as hereinafter set forth.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Brothers v. Union Oil Co. of California*, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). The identical invention must be shown in as complete detail as is contained in the claim. *Richardson v. Suzuki Motor Co.*, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989).

Claims 1 through 3, 5 through 7 and 19

Claim 1 of the presently claimed invention is directed to a method of monitoring a structure. The method comprises: attaching a plurality of laterally adjacent conductors to the

structure; defining *each conductor* of the plurality *to include a plurality of segments coupled in series*, each segment having an associated unit value representative of a defined energy transmitting characteristic; *defining a plurality of identity groups, each identity group including a plurality of laterally adjacent segments wherein each identity group includes at least one segment from each of the plurality of conductors*; transmitting energy through each of the plurality of conductors; monitoring each of the plurality of conductors for changes in the defined energy transmitting characteristic; and *comparing a first change in the defined energy transmitting characteristic in at least one conductor* of the plurality *with a second change in the defined energy transmitting characteristic in at least one other conductor of the plurality.* Applicants submit that Laska fails to teach all of the limitations of claim 1 of the presently claimed invention.

The Examiner cites Laska as disclosing a structural monitoring device with features of the claimed invention including: a plurality of laterally adjacent conductors; a plurality of segments (groups) associated with a value representative of a defined energy transmitting characteristic; and the monitoring of each of the plurality of conductors for changes in the defined energy transmitting characteristic in at least one conductor of the plurality with a second change in the defined energy transmitting characteristic in at least one other conductor. Applicants respectfully disagree with the Examiner's characterization of Laska.

Laska discloses a system for monitoring and detecting structural defects in mechanical structures such as, for example, the skin of an airplane. The system includes one or more groups (10) of elongated electrical conductors. The conductors include a plurality of metal foil type conductors (12) connected *in parallel.* (See, col. 1, lines 35-37). The metal foils are electrically equivalent. (Col. 1, lines 37-38). A supplemental resistance (14) is coupled to each metal foil. Each group of conductors is connected to ground at one end thereof and to an ohmmeter (16) at a second tend thereof. Each group of conductors is "bonded into intimate but electrically insulated contact with the mechanical structure." (Col. 1, lines 45-46).

Each group of conductors is used to monitor different locations on the mechanical structure. A multiposition switch (22) is coupled with the plurality of groups of conductors so that a particular group of conductors may be selectively monitored. A warning system may

include a light (32) that is activated upon the occurrence of certain events associated with the groups of conductors. A capacitor is associated with the system and configured such that it will not fully charge until the resistance of a group (10) increases beyond its normal value. When the capacitor is fully charged, a transistor conducts and energizes a solenoid holding circuit (34) causing the warning light to remain energized thereby indicating a failure as detected by a specific group of conductors.

Each group of conductors is configured to detect a failure in the associated structure in the following manner:

> If a defect or crack should be present the tapes [or foils] 12 in group 10 bonded at the point of defect will break, changing the resistance of *the group* 10. The change in resistance *of group 10* is read on ohmmeter 16. The degree of change in resistance *of group 10 from the normal* indicates the extent of the structure failure, to wit, the number of tapes 12 broken. If all tapes 12 in a group 10 are broken the resistance goes to infinity and the indication is that the break or crack on the structural member is severe. (Col. 2, lines 5-14, emphasis added).

In other words, each individual *group* (10) of conductors is monitored for an increase in resistance. The change of resistance of an individual conductor is not monitored, nor is it compared to the change in resistance of any other conductor within a given group. Indeed, considering the configuration of the Laska system, including the fact that that the conductors (or metal foils 12) are connected in parallel (see, col. 1, lines 36-37), it appears to be impossible to monitor and compare a change in resistance from one specific conductor of a given group to another conductor thereof. Furthermore, there is no teaching of comparing the change in resistance noted in one group of conductors to a change in resistance of another group of conductors.

Laska clearly fails to teach defining *each conductor* of a plurality of conductors *to include a plurality of segments coupled in series*, wherein each segment has an associated unit value representative of a defined energy transmitting characteristic.

Additionally, Laska does not teach *defining each conductor of the plurality to include a plurality of segments coupled in series, each segment having an associated unit value representative of a defined energy transmitting characteristic*, while also *defining a plurality of identity groups, each identity group including a plurality of laterally adjacent segments wherein each identity group includes at least one segment from each of the plurality of conductors.* In other words, if the Examiner considers each of the foils (12) to be a conductor, Laska fails to teach defining each conductor of the plurality to include a *plurality* of segments. On the other hand, if the Examiner considers the group (10) of Laska to be a "conductor" with a plurality of segments (foils 12), Laska can not be viewed as defining a plurality of identity groups wherein each identity group includes a plurality of laterally adjacent segments and wherein each identity group includes at least one resistance segment *from each of the plurality of conductors.*

Moreover, Laska also fails to teach *comparing a first change in the defined energy transmitting characteristic in at least one conductor* of the plurality *with a second change in the defined energy transmitting characteristic in at least one other conductor of the plurality.* In contrast, Laska teaches the detection of an increase in resistance of the entire group (10) of conductors/foils (12).

As such, claim 1 is clearly allowable over Laska. Applicants further submit that claims 2, 3, 5 through 7 and 19 are allowable, among other reasons, for being dependent from an allowable base claim.

With respect to claims 2, 3, 5 and 6 Laska fails to teach determining a specific identity group from which *the first change in the defined energy transmitting characteristic and the second change in the defined energy transmitting characteristic were initiated.* While the Examiner cites to the use of a warning device (i.e., light 32) "to identify the change in a specific group" (Office action, page 3), the warning light simply indicates when the resistance of the *group* increases beyond a normal value. Such fails to meet the limitation of determining an identity group from which a first change *and* a second change are initiated as required by claim 2.

With respect to claim 3, Laska fails to teach that determining a specific identity group includes *determining a ratio* of the first change in the defined energy transmitting characteristic with respect to the second change in the defined energy transmitting characteristic.

With respect to claims 5 and 6, Laska fails to teach comparing the first change in the defined energy transmitting characteristic with the unit value *for the segment* which is both located with the specific identity group and *formed in the at least one conductor.*

With respect to claim 6, Laska fails to teach comparing the second change in the defined energy transmitting characteristic with the unit value *for the segment* which is both located with the specific identity group and formed in *the at least one other conductor.* As noted hereinabove, Laska teaches the monitoring of a change in resistance by detecting an increase of resistance for the entire *group* (10) of conductors. Such a disclosure simply does not teach the limitations of claims 5 and 6 of the presently claimed invention.

With respect to claim 7, Laska fails to teach that defining a plurality of identity groups includes assigning the unit values to each of the plurality of laterally adjacent segments of each identity group such that each identity group may be identified by a concatenated digit string representative of the unit values contained therein.

Applicants, therefore, respectfully request reconsideration and allowance of claims 1 through 3, 5 through 7 and 19.

Claims 20, 21 and 23

Independent claim 20 of the presently claimed invention is directed to a method of monitoring strain induced within a structure. The method comprises: attaching a plurality of laterally adjacent conductors to the structure such that a strain exhibited by the structure will be substantially transferred to the plurality of conductors; *defining each conductor of the plurality to include a plurality of resistance segments*, each resistance segment exhibiting an associated unit resistance value and each of the plurality of conductors being configured to exhibit a change in resistivity upon experiencing a strain therein; *defining a plurality of identity groups, each identity group including a plurality of laterally adjacent resistance segments wherein each identity group includes at least one resistance segment from each of the plurality of conductors*; transmitting energy through each of the plurality of conductors; monitoring the plurality of conductors for changes in resistance therein; and *comparing a first change in resistance in at least one*

conductor of the plurality with a second change of resistance in at least one other conductor of the plurality.

The Examiner cites Laska as disclosing: a structural monitoring device with features of the claimed invention including a plurality of laterally adjacent conductors; a plurality of segments (groups) associated with a value representative of a defined energy transmitting characteristic; and the monitoring of each of the plurality of conductors for changes in the defined energy transmitting characteristic in at least one conductor of the plurality with a second change in the defined energy transmitting characteristic in at least one other conductor. Applicants respectfully disagree with the Examiner's characterization of Laska.

As set forth hereinabove, Laska teaches a system which includes a group of conductors connected in parallel to one another, wherein a change in resistance of the entire group of conductors is monitored in order to determine an associated failure in the structure to which the group of conductors is mounted.

However, Laska does not teach *defining each conductor of the plurality of conductors to include a plurality of resistance segments*, while also *defining a plurality of identity groups, each identity group including a plurality of laterally adjacent resistance segments wherein each identity group includes at least one resistance segment from each of the plurality of conductors.* In other words, if the Examiner considers each of the foils (12) to be a conductor, Laska fails to teach defining each conductor of the plurality to include a *plurality* of resistance segments. On the other hand, if the Examiner considers the group (10) of Laska to be a "conductor" with a plurality of resistance segments (foils 12), Laska can not be viewed as defining a plurality of identity groups wherein each identity group includes a plurality of laterally adjacent resistance segments and wherein each identity group includes at least one resistance segment *from each of the plurality of conductors.*

Additionally, Laska clearly fails to teach *comparing a first change in resistance in at least one conductor of the plurality with a second change of resistance in at least one other conductor of the plurality.* As previously noted, Laska only discloses the monitoring of a collective increase in resistance of a group (10) of conductors as compared to normal.

As such, claim 20 is clearly allowable over Laska. Applicants further submit that claims 21 and 23 are also allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 21, Laska fails to teach locating a situs of the strain exhibited by the structure by identifying the specific identity group from which the first change in resistance (of the at least one conductor) *and* the second change in resistance (of the at least one other conductor) were initiated.

With respect to claim 23, Laska fails to teach determining a magnitude of the strain exhibited by the structure by comparing the first change of resistance to the associated unit resistance value *of the resistance segment which is both located in the specific identity group and formed in the at least one conductor.* Applicants further note that claim 23 is dependent from claim 22 which has been indicated by the Examiner as containing allowable subject matter.

Applicants, therefore, respectfully request reconsideration and allowance of claims 20, 21 and 23.

Claims 29, 31 and 32

Independent claim 29 is directed to a system for detecting physical phenomena in a structure. The system comprises: a plurality of laterally adjacent conductors, *each conductor including a plurality of segments having an associated unit value representative of a defined energy transmission characteristic*; and *a plurality of identity groups, each identity group including a plurality of laterally adjacent segments including at least one segment from each conductor, wherein each segment within an identity group exhibits an associated unit value such that the unit values of each identity group may be represented by a concatenated digit string of the unit values and wherein each identity group exhibits a unique concatenated digit string relative to each other identity group.*

The Examiner cites Laska as disclosing: a structural monitoring device with features of the claimed invention including a plurality of laterally adjacent conductors; a plurality of segments (groups) associated with a value representative of a defined energy transmitting characteristic; and the monitoring of each of the plurality of conductors for changes in the

defined energy transmitting characteristic in at least one conductor of the plurality with a second change in the defined energy transmitting characteristic in at least one other conductor. Applicants respectfully disagree with the Examiner's characterization of Laska.

As set forth hereinabove, Laska teaches a system which includes a group of conductors connected in parallel to one another, wherein a change in resistance of the entire group of conductors is monitored in order to determine an associated failure in the structure to which the group of conductors is mounted.

However, Laska fails to teach a plurality of laterally adjacent conductors, wherein each conductor includes *a plurality of segments* having an associated unit value representative of a defined energy transmission characteristic. While Laska may be seen as teaching a group (10) comprising a plurality of laterally adjacent conductors (12), such conductors do not each include a plurality of segments having an associated unit value representative of a defined energy transmission characteristic.

Nor does Laska teach *a plurality of identity groups,* wherein each identity group includes a plurality of *laterally adjacent segments including at least one segment from each conductor*, wherein each segment within an identity group exhibits an associated unit value *such that the unit values of each identity group may be represented by a concatenated digit string of the unit values and wherein each identity group exhibits a unique concatenated digit string relative to each other identity group.*

While Laska teaches a plurality of groups (10) of conductors, such groups are not configured or arranged in the manner set forth in claim 29 of the presently claimed invention. More specifically, lacking conductors that include a plurality of segments as required by claim 29, it is clear that Laska does not teach a plurality of identity groups wherein each identity group includes at least one segment from each conductor. Nor is there any teaching of representing a group of segments by a concatenated digit string, or that each identity group exhibit a unique concatenated digit string relative to each other identity group.

As such, claim 29 is clearly allowable over Laska. Applicants further submit that claims 31 and 32 are also allowable as being dependent from an allowable base claim as well as for the additional patentable subject matter introduced thereby.

With respect to claim 32, Laska fails to teach that each *segment* is configured to exhibit a change in the defined energy transmission characteristic upon experiencing a strain therein.

Objections to Claims 4, 8-18, 22, 24-28, 30, and 32-39/Allowable Subject Matter

Claims 4, 8 through 18, 22, 24 through 28, 30, and 32 through 39 stand objected to as being dependent upon rejected base claims, but are indicated to contain allowable subject matter and would be allowable if placed in appropriate independent form.

As set forth hereinabove, independent claims 1, 20 and 29 are in condition for allowance and, therefore, all claims depending therefrom (including claims 4, 8 through 18, 22, 24 through 28, 30 and 32 through 39) are in condition for allowance. Applicants respectfully request reconsideration of claims 4, 8 through 18, 22, 24 through 28, 30 and 32 through 39.

ENTRY OF AMENDMENTS

The amendments to claims 1, 2, 20 and 29 above should be entered by the Examiner because the amendments are supported by the as-filed specification and drawings and do not add any new matter to the application. Further, the amendments do not surrender any scope of claimed subject matter but are made to correct clerical errors.

CONCLUSION

Claims 1 through 40 are believed to be in condition for allowance, and an early notice thereof is respectfully solicited. Should the Examiner determine that additional issues remain which might be resolved by a telephone conference, he is respectfully invited to contact Applicants' undersigned attorney.

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Date: 28 JULY 2004